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We Claim:

- 1. A device for hybridization reaction between a target molecule in a fluid and a probe, which comprises:
- a microfluidic channel comprising a first portion and a second portion following said first portion, wherein said first portion has an irregular cross section and said second portion has a probe, and
- a fluid driving element connected the ends of said channel with tubes, wherein said fluid element can move said target molecules back-andforth for repeatedly passing through said second portion.
- 2. The device of claim 1, wherein said irregular cross section is produced by irregularly changing the size of the cross section of said first portion of said channel.
- 3. The device of claim 1, wherein the inner surface of said microfluidic channel is rough or has recess slots.
- 4. The device of claim 1, wherein said probe is nucleic acid, peptide or peptide nucleic acid.
- 5. The device of claim 4, wherein said nucleic acid is DNA or RNA.
- 6. The device of claim 4, wherein said nucleic acid is singlestranded nucleic acid or double-stranded nucleic acid.
 - 7. The device of claim 1, which further comprises a means for providing energy to said target molecules.
 - 8. The device of claim 1, which can be used in removing the target molecules non-specific binding to said probes.
 - 9. A process for increasing hybridization reaction between a

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target molecule and a probe, comprising the following steps:

- (a) providing a microfluidic channel comprising a first portion and a second portion following said first portion, wherein said first portion has an irregular cross section and said second portion has a first probe and second or more probes wherein said first probe specific binds to said target molecule;
- (b) introducing a fluid containing said target molecule into the microfluidic channel of the device for hybridization reaction of the invention;
- (c) driving said fluid to flow back and forth so that said target molecule can repeatedly pass through said second portion, whereby said target molecules non-specific binding to the second or more probes are removed and the target molecules binding to first probe are retained.
- 10. The process of claim 9, wherein said probe is nucleic acid, peptide or peptide nucleic acid.
- 11. The process of claim 10, wherein said nucleic acid is DNA or RNA.
- 12. The process of claim 10, wherein said nucleic acid is single-stranded nucleic acid or double-stranded nucleic acid.
- 13. The process of claim 9, wherein the surface of said channel is rough.
- 14. The process of claim 9, wherein said irregular cross section is produced by irregularly changing the size of the cross section of said first portion of said channel.
- 15. The device of claim 9, which further comprises a step for providing energy to said target molecules.